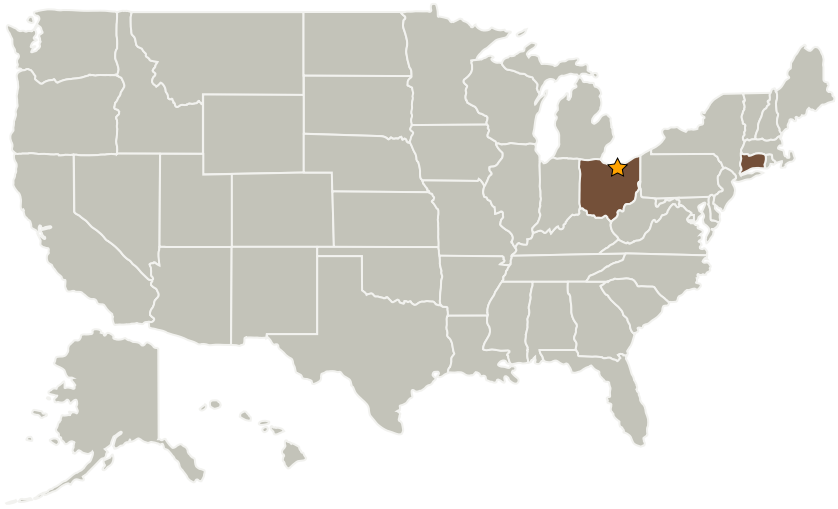
Electrospray Collection of Airborne Contaminants, Phase I

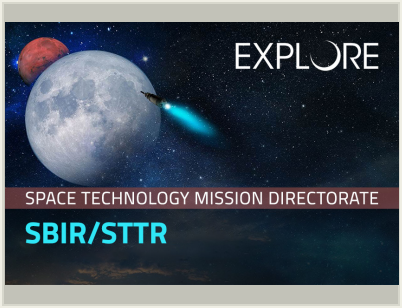
Completed Technology Project (2007 - 2007)

Project Introduction

In stark contrast to current stagnation-based methods for capturing airborne particulates and biological aerosols, our demonstrated, cost-effective electrospray technology employs an entirely different approach based on the remarkable effectiveness of small, highly charged liquid droplets formed from an electrospray source to "getter" both particles and polar molecules dispersed in a gas. Less capable and expensive collection system technologies are generally based on stagnation of high velocity ambient airflow on a collecting surface. The momentum of particles and heavy molecules precludes their following gas streamlines during this stagnation. Instead, they concentrate and are trapped on the detector's surface if the surface is "sticky," or concentrated in the surface boundary layer, which can be separated from the mainstream flow and collected. Typically, current separation methodology collects about 50 percent of the particles between 1.0 and 10 microns in diameter from a flow of 500 L/min with a power consumption of up to 500 watts; i.e., about 1 watt of power is required for a small fan to compress 1 liter of air per minute to produce the high velocity airflow necessary for effective trapping of small bio-particles and heavy molecules. However, our electrospray technology consumes negligible power and achieves virtually 100 percent particle collection. In fact, we have demonstrated that the power efficiency of electrospray gettering for a single electrospray emitter to collect 100 percent of the particles, without a fan, at 10,000 times greater than the power efficiency of state of the art systems.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Connecticut Analytical Corporation	Supporting Organization	Industry	Bethany, Connecticut

Primary U.S. Work Locations	
Connecticut	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.2 Electrostatic